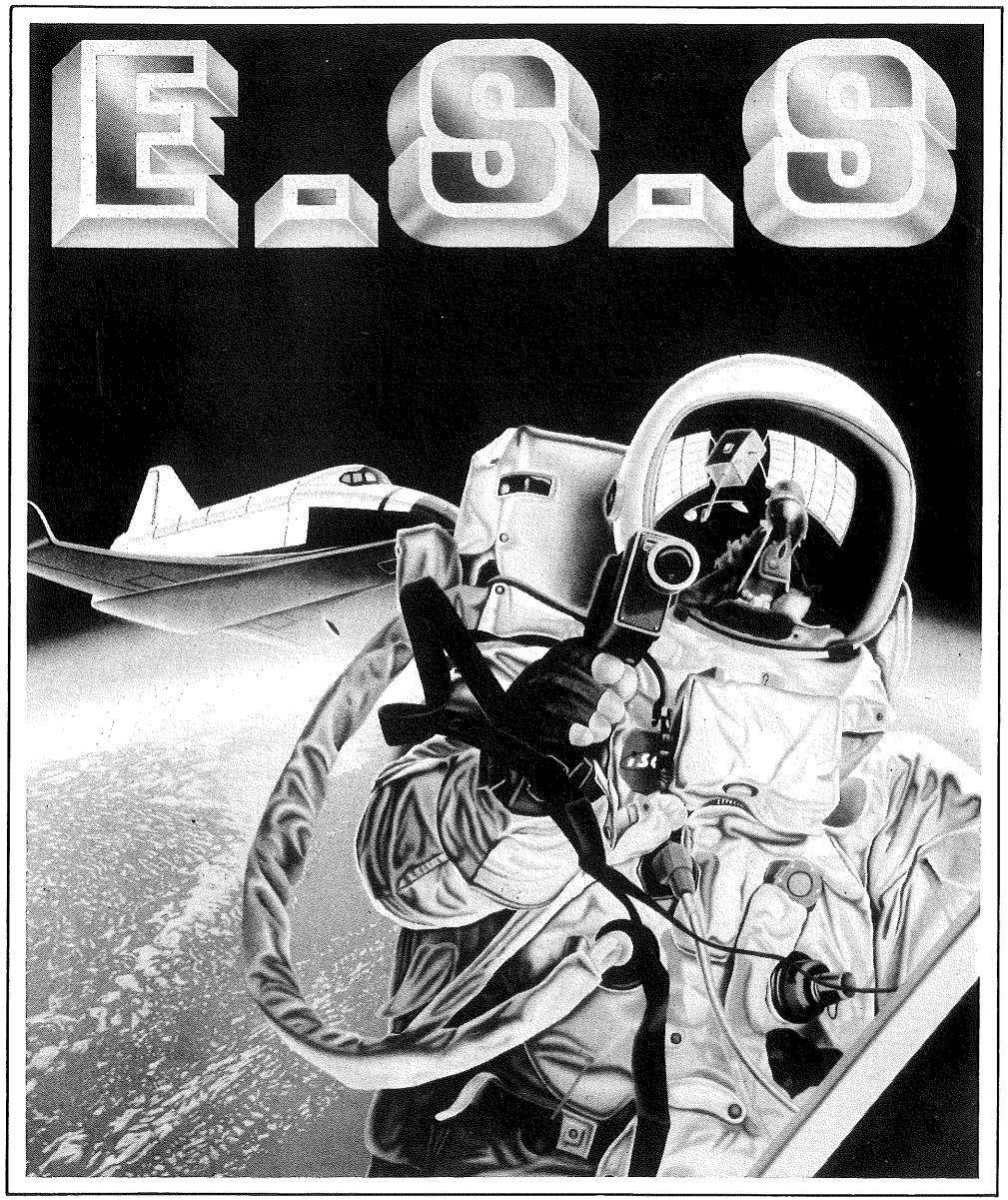

TOMAHAWK

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We wish to thank for their help :

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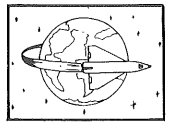
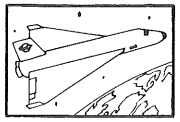
EUROPEAN SPACE SIMULATOR



Welcome on board of E.S.S. (European Space Simulator) !
You are going to have a fantastic experience, and get to know sensations that very few people on this planet have had. You are going to join the very private club of the «Space Men», «Cosmonauts» for the Russians, «Astronauts» for Americans, «Spacionauts» in France, everywhere, those men who have seen the Earth revolving are envied, worshipped and respected.

SPACE SHUTTLES



The first men who were sent into space used to move in capsules they could hardly manoeuvre in weightlessness. Their return on Earth was a delicate and dangerous phase, for they used to fall almost like meteorites.

They managed to make them fall down into the sea or on deserted areas. A parachute used to break the last part of the fall so as to save the crew. But the space capsule which had been burnt when coming back into the atmosphere, was ready for the scrap heap.

The american shuttle has one advantage, which is the ability to manoeuvre when entering the atmosphere. Its aerodynamic shape allows it to brake smoothly and to land by gliding over a well prepared landing runway. On the other hand, besides the fact that is much heavier to launch than a standard space-capsule, the crew and the pay-load have to be put together.

Precautions which would be useless just for the freight are compulsory to preserve life (environment, limited acceleration speed, etc...).

Besides the maintenance and replacement of some particularly delicate and complex spare parts don't make it as easy to use again as N.A.S.A. had expected.

Hermes, the european space-aircraft, propelled by the Ariane 5 rocket, is meant to be a much more flexible and efficient system, able to put into orbit satellites as well as space-station modules. Besides, the automated flight option allows to do without life-preservation systems and all aircraft equipment usually essential in manned flights.

On the contrary, without any freight, Hermes can take up six men (seven in the american shuttle) and remain in waiting orbit for a month (eight days for Americans).

The orbiter used by I.S.C. (International Space Corporation) is an imaginary machine made on the pattern of already existing shuttles (american, european, russian). At the time of the game (2010), this type of orbiter is already an old and widely known craft.

Government agencies, of course, have far more sophisticated machines at their disposal (which haven't yet appeared on modern engineers' plans), but their price is far too high for a (relatively) small private company.

So, it's on board of the THOT orbiter (an egyptian god with an ibis-like head, counterpart of the greek-god Hermes) that you'll have the pleasure of performing missions which will be usual to spacionauts within twenty years.

From the astronomical point of view, a satellite is an object which revolves round a planet, according to a precise trajectory named orbit. The moon is thus the satellite of The Earth. Other planets have satellites : Jupiter, the largest planet in the solar system, has sixteen of them.

Besides these «natural» satellites, men have launched and put into a steady orbit «artificial» satellites. Full of scientific machines, some can even be lived in, such as the american «Skylab» or the russian «Soyouz».

These artificial satellites can have several functions:

• Telecommunication satellites are used to broadcast TV programmes , telephone links and radio transmission.Thanks to such satellites, we can get TV programmes, from all over the world or follow sailing-boats in races or peregrinations of protected species in nature reserves at any time.

• Observation satellites make a precise and thorough examination of the Earth possible. They show the state of vegetation, inform of storms or photograph clouds complexes. They indicate pollution or detect natural ressources deposits. They study volcanos or spot fish shoals.
They can also give military information, keep watch on the traffic (air, sea and on Earth), spot intercontinental rockets ; they might even be able to destroy them in a close future.

• Other satellites have even more specialized functions, and are used for experiments or scientific missions. Giotto was able to observe the Halley comet, others have left to explore the solar system or even the closest stars...

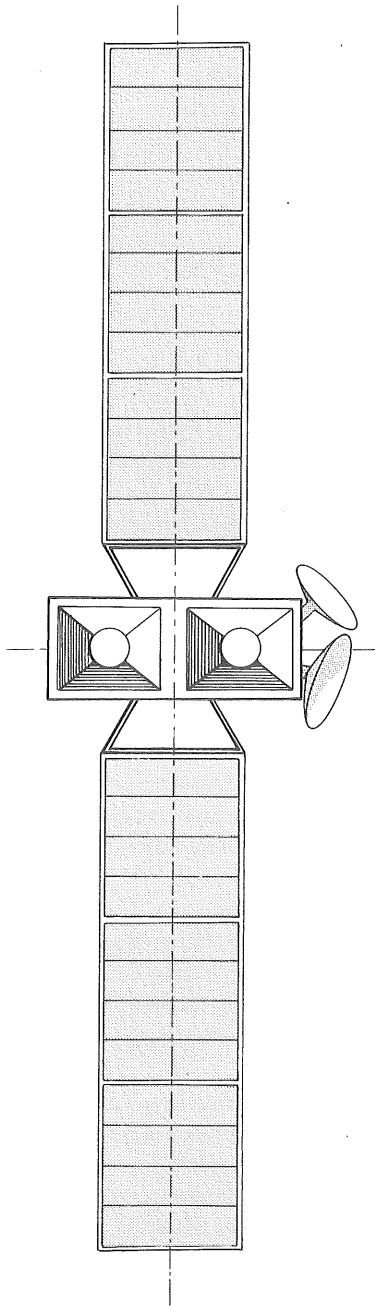
Two types of satellites are proposed to I.S.C. :
- Gyrostabilized : to keep their balance, these satellites rotate on themselves permanently. It is a tested, secure and cheap technique. Their solar sensors are generally integrated around their surface.
- 3-axis stabilized : in the three rotation axes (x,y,z) some computer-controlled nozzles keep the machine steady. This sophisticated and efficient technique is unfortunately less secure.

The solar-array, which are folded when the satellite is put into orbit by the space-aircraft, open out when the satellite is in its orbit. They are then about fifteen meters large. They supply with electric energy thanks to photo-batteries which detect solar energy. When the satellite is in the shade of the Earth, some batteries take over.

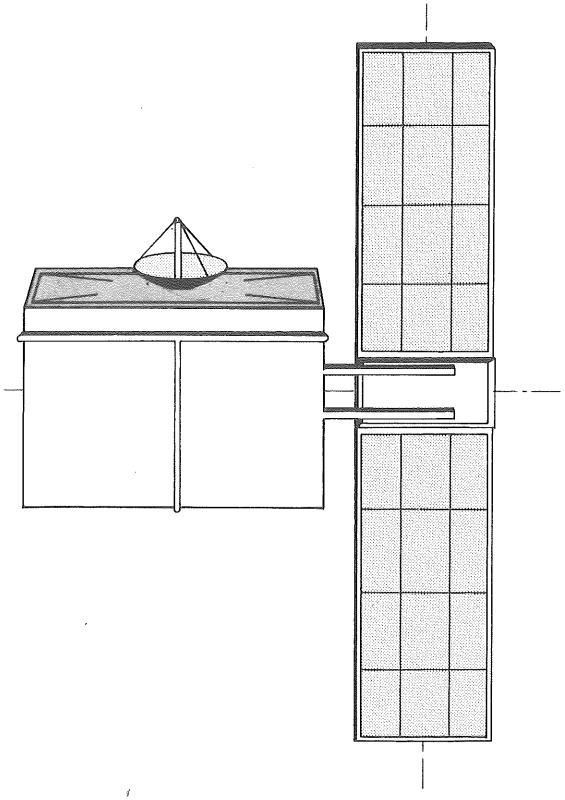
A satellite is made of several modules, in which one of the mission specialists who will form the crew (communication, data processing, mechanical) can be interested . The telecommunication module contain s:
- antennae (parabolic, cone shaped) directed towards the Earth ;
- Repeaters that is to say amplifier relays.

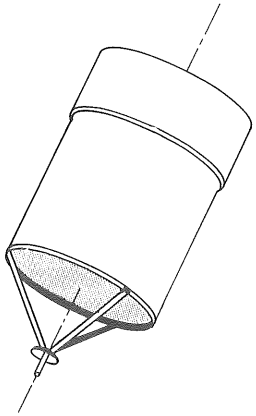
The service module contains :
- the instruments which control the attitude, the orbit and the stability of the satellite ;
- the log-computer ;
- the data transmission system (pictures, sounds, etc...)
The propulsion module concerns the engines and the nozzles which allow the satellite to keep correct position and orientation.

The size and weight of an artificial satellite can vary



3-AXIS STABILIZED

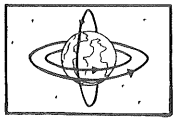




GYROSTABILIZED

according to the use it has been planned for. TRS2 weighted 600 gr, Skylab 90 tons. The heavier a satellite is, the more necessary a powerful launcher is to put it into orbit.The space aircraft is precious to put heavy loads into low orbit (between 200 and 500 km).

ORBITS



Three orbits are particularly used :

• the low or «equatorial» orbit, at a distance of 200 to 500 kms from the Earth. It is the only one used by I.S.C. during this simulation. Within 80 minutes a satellite goes round the world above the equator. This is where the future space stations will be placed to welcome visitors coming from the Earth by space aircraft ;

• the «héliosynchronous» orbit, for it is synchronized on the rotation of the sun («helios» in greek), is placed at a distance of 600 to 800 kilometers. Perpendicular to the previous one, it goes from one pole to the other in the sky. It allows to see permanently the light part of the Earth which passes by, below the satellite. It's the observation satellites'orbit.

• the «geostationary» orbit, finally, is placed on the equatorial line,like the low orbit in 24 hours, at the same speed as the Earth. So apparently , it is motionless above a good third of the planet. It is the orbit most in demand for big communication satellites,it can only receive a limited amount of satellites.

In the10 s (2010...), when the game is taking place, it is more likely to imagine that there will be a lack of room on the orbits. Private companies such as I.S.C. will certainly be allocated concessions on some orbits. They will then be in charge of providing security and maintenance of their satellite stock. Some governments or private companies give the corporation the responsibility of putting satellites into orbit. As long as the satellite carries out its function properly, I.S.C. gets paid on the basis of monthly fees. This remuneration stops if ever the satellite breaks down. There are even fines planned in case the breakdown is not repaired quickly, or if the corporation has not done its job properly. As soon as 1984, 80 millions dollars were paid by insurance companies for two satellites which had been launched in a wrong orbit !

The life expectancy of these satellites is variable. Some last one and a half year,others three, seven, and up to fifteen years. Their life expectancy depends on the robustness of the equipment on board: propulsion means, machines which supply with electricity etc... but also
on their altitude. In low orbit, the bodies which go through the atmosphere although it is thin undergo harmful frictions.
Little by little, they lose altitude until they stall and irremediably fall towards the Earth.

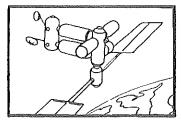
An american satellite, Big Bird, with a colossal weight of 13 tons, was launched into orbit 160 km away, which only gave it a life expectancy of a few months. Equipped with a hypersensitive cine-camera, it could see and photograph objects as small as a book on Earth.

Even in case the Telecommunication module breaks down, mute, a satellite keeps on turning. But in case of a propulsion breakdown, it falls down onto the Earth after a few days and hopefully disintegrates in the atmosphere.

Thanks to the space aircraft, it is becoming possible to repair some breakdowns occuring on satellites. Thus, a solar panel badly unfolded or a nozzle: that has to be replaced will soon be the mission of real «space repair-teams».

If the breakdown is more serious than expected, or if the repairing happens to be impossible on the spot, I.S.C. is in charge of getting the satellite back and taking it to the orbital station where it will be repaired. In case the building of the station would not be quite finished, the satellite would have to be taken back onto the Earth. This is what they do at the moment, but it's a very expensive solution, since the satellite, once repaired, will have to be launched again.

STATIONS



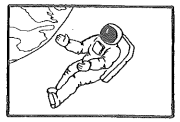
As you can realize during the game, what is expensive is the launching. The fuel used to lift a rocket from the earth's gravity is much heavier than the live- load it takes away. It is an economic aberration to go continually from the Earth to space and vice-versa just to convey men and equipment. So it's advisable to have fixed installations in space where technicians can live and equipment can be kept in stock : space stations in low orbit.

To space men, these stations offer a more comfortable shelter than the narrow cabin of a shuttle or space capsule, and allow very long-term missions.They can also be used as relay stations for other operations such as the opening out of space systems, the transferring of pay-load towards «orbital tow-aircraft», atomic propulsion system which function is to put them into orbit at a lower cost than a usual launcher.

Another use of these stations is to benefit from the surrounding conditions of near-weightlessness in order to install study and production laboratories for material which cannot be produced on Earth ; or to make observations and astrophysical experiments which the atmosphere on our planet would not allow. These stations have been achieved like modules linked to one another by airlocks. They are adaptable and thus can be adapted to all kinds of use.

The managing of these stations and their supplying of food is not the responsibility of I.S.C. so you will not have to worry about it. On the other hand, part of the home-modules (HOME) and the stocking-modules (STORE) are left at the disposal of the Corporation to avoid taking back onto the Earth men and equipment which could be useful later.

SPACE MEN



In 2010, the age of space-tourism hasn't come yet. Spacionauts are no longer «heroes» prepared to sacrifice their lives like in the first mission in the sixties. They are more regarded as very competent specialists in their own field.They must be very fit, and must have some training to get used to gravitational pressure and weightlessness. But above all, they are workers, «almost» like any others.

The professionals of the International Space Corporation can be divided into three categories :

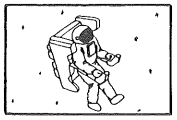
• Pilots : they are competent astronauts who have a great experience of flying in space but also usual piloting (planes, helicopters, gliders, etc...). They are crack-pilots capable of all aerobatics both in weight lessness or under the most unpleasant gravity.

• The pay-load specialists : scientists but not professional astronauts, they carry out research in space in very precise fields : astrophysics or bio-technology. They can also be military men whose missions are

often top secret. As soon as the space station is almost finished, the I.S.C., who is responsible for the works, sees to transfer safely those specialists and their equipment so that they can made their experiments. They usually remain in orbit for six months until they are taken back.

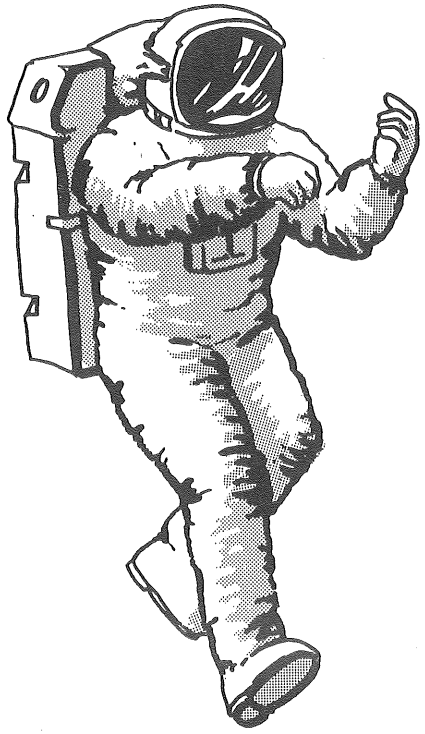
- Mission specialists : both scientists and professional astronauts. They provide a link between members of the crew, they control, adapt and repair environment and communication control systems, electric or computer systems, the opening and closing mechanisms of the hold. They can help pay-load specialists in their research and are trained to go out into space (EVA, that is to say Extra Vehicular Activities). Each of them has had specific training on the maintenance of satellites. They are able to repair either breakdowns on communication systems (aerials, transmitter, etc...), on electronic or computer parts (electric circuits, calculators, etc...) or on purely mechanical parts of satellites (nozzles, panels, etc...).

GOING TO SPACE



Generally, the pilot doesn't go out in space. The adequate mission specialist will get, in a space-suit, to the satellite which has broken down. This space-suit, which weighs more than a hundred kilos in terrestrial gravity, is a real vital support system as it provides with the oxygen necessary to breathing, exhauts the carbon dioxide out of expiration, controls the temperature and maintains pressurization as well as it protects against micro-meteorites. It has a seven-hour autonomy, with a security margin of thirty minutes for the oxygen reserve. An integrated microprocessor controls the essential functions. Not only does it warn its user against any technical incident, but it gives efficient advice on actions to take to repair the damage.

The space-suit still offers total freedom of gesture and allows the user to drink or to relieve himself. It can resist to violent variations of temperature which can go from -157° to + 121°.



Before going out, the spacionaut ties on his back a «space scooter», a manned manoeuvring unit, also called «M.M.U.», «jet rucksack» or «space armchair», for it has something in common with the three. It looks like a metal rucksack equipped with arms like an armchair but without a seat !

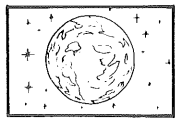
And it can propel our specialist in all directions. The spacionaut can put on or take off this gear without any help. It is a complex engine propelled with an expulsion of liquid azote which stream you can direct with handles placed on the arms of the armchair.

Like the shuttle, its twenty four nozzles (7.56 newtons in push each) allow push and rotation in all directions.

Each scooter is equipped with an automatic-camera. It finally has a magnetic hook in order to trim, if necessary, with any metallic structure (shuttle, satellite or station).

When the mission specialist leaves the shuttle, he takes with him 335 kg of equipment (scooter + space garment + fuel).

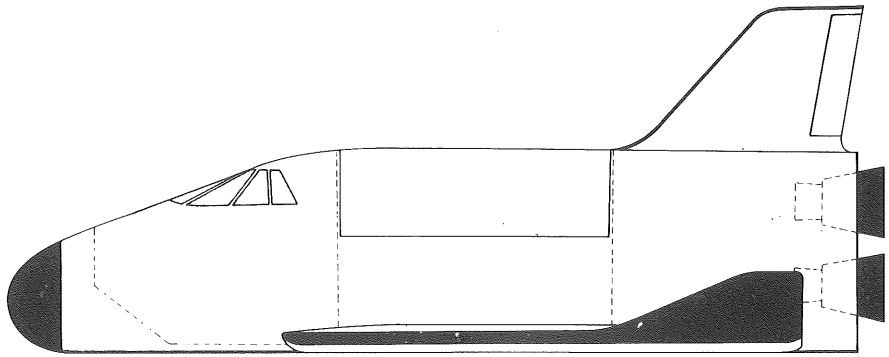
THE LANDING



At the end of the mission, the shuttle gets ready to go back on Earth.

It is done in two phases :
- the starting of the retrorocket which allows the shuttle to leave its orbit initiate the descent ;
- the final approach in gliding descent and the landing.

If today the landing is done on specifically devised earth's tracks, it is likely that in the future, some huge shuttle-carriers (aircraft-carriers adapted to shuttles) will be able to move on the seas and place themselves in the best position to receive the shuttle. That last hypothesis has been kept for this simulation



ESS : THE GAME

The general purpose of the game is to put satellites into orbit, to build a space station, and then to manage the maintenance of this orbital stock.
During the first phase, you are on earth, on the launching site of the International Space Corporation (I.S.C.)

Then, after take-off, you are in command of the «Thot» shuttle. You start with deciding on the changes of orbit, then you pilot the shuttle in weightlessness towards your objectives.

You can also go out in space with a «space-suit» and a space-scooter.
Finally, you go back on to earth in gliding descent to land on a huge shuttle-carrier which will take you back to the site.

Several missions can follow one another during the game. The game starts in January 2010 and carries on until December 2013.

END OF THE GAME : At the end of the game, the number obtained in your capital will show your degree of success.

There are three ways of earning money :

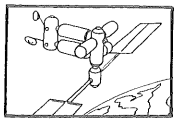
- The first one is to send satellites into orbit. Indeed, you will get monthly fees for each of them. But if ever a breakdown (even a slight one) should affect the satellite, you will no longer get the fees. Besides, if that breakdown should get worse, you would have to pay a monthly fine equal to the fees you got previously.

Finally, if it became impossible to repair the satellite, you would have to destroy it in order to leave the position it has on the orbit free.

- The second way of making money is to convey experiments to the orbital station. Once the experiment has been achieved, you will get a lot of money. Be careful ! The number of seats in the station is limited by its size ! So you had better build it quickly.

- The third way of making money is to succeed in landing.

A - PREPARING THE MISSIONS



On the launching site, you will prepare your first mission, making a series of choices. In the upper left-hand corner of the screen, the following information will appear permanently :

DATE : it is important to launch satellites before the prescribed date given for each of them. A time limit of one to four months (according to the level of the game chosen) separates the launchings, remember it !

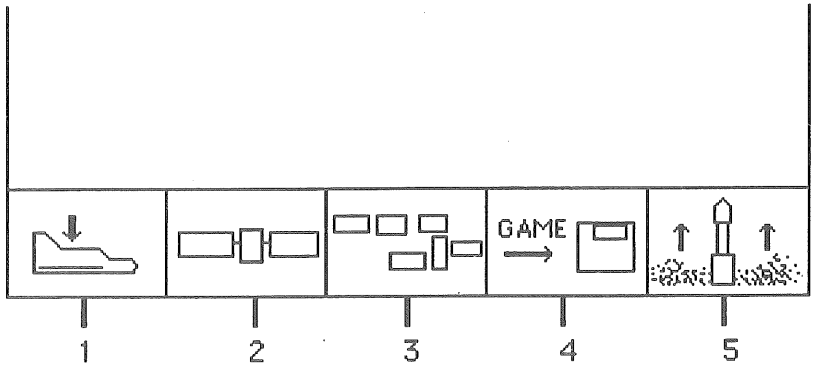
SATELLITES : the total amount of monthly fees received (or owed) for the whole of satellites presently in orbit. These fees are taken into account at the end of each mission according to the time spent. Then, if the meter shows 3 000 and if the time spent between two missions lasted 4 months, the amount going into the capital at the end of each mission is equal to 12 000.

CAPITAL : the number showed corresponds to the present capital of the I.S.C. before taking off. All prices showed in the game are given in crown-kilos, that is to say that one unit corresponds to 1000 crowns (about 7 000 francs).

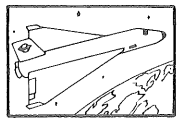
In the control room, you will also find a huge screen on which the launcher and the shuttle are waiting until the loading has been achieved, in order to take off.

Five knobs at the bottom of the screen allow you to prepare your mission with care. You can get to these knobs by clicking on them with the curser moved to the mouse (or with the arrows on the keyboard).

1: Equipment
2: Satellites
3: Station
4: Game
5: Takeoff



A 1 - EQUIPMENT



This screen allows you to choose the crew, the equipment and the fuel you will take for the next mission. On the left-hand corner of the screen, you will see an extended view of the shuttle where you can place the load of your choice.

On the lower left-hand corner of the screen, 2 elements appear :

- Scale : each time you decide to load one element onto the shuttle, you can see its weight appearing on the scale on the lower left-hand corner, up to the maximum weight. The total weight admitted on the «THOT» shuttle is 7000 kg.

- Budget : also under the next note, you can work out the positive or negative effect of this choice on your budget. Be careful, as your choice can be changed until taking-off, you will only see the change on your capital in the control room once you are back from your mission. Of course, only the energy used during the flight (fuel and life support) will really be deducted of your capital.

The 3 meters on the upper left-hand corner of the screen mean :

- **ORBIT ENERGY** : this meter shows the fuel level used for changing orbits.

- **APPROACH ENERGY** : this meter shows the fuel level used for approach manoeuvres to objects in orbit.

- **LIFE SUPPORT** : the oxygen cylinder shows the «life support» level, that is artificial atmosphere reserve, as well as food,water and indispensable commodities to human life in space.

The shuttle is already loaded with fuel and «life-support», to avoid any danger if ever you launched an immediate take-off. Feel free to change the load, according to the mission you have chosen.

To get to the several elements of your mission, you will have to click on one of the five icons which are on the left hand side of the screen (use the mouse or move the cursor thanks to the arrows and press the ENTER key).

The choice of some icons will cause a decision monitor to appear, in which you can decide as to the load of your next mission.

The decision monitor can be used by pressing certain keys :

- **Forward/backward arrows** (click on it or ENTER) :
They allow you to view the complete list of objects available, in order to choose the one you wish to select.

- **Select** (click on it or ENTER)
It allows to select one element. An icon will appear that will replace the mouse cursor. Place that icon onto the extended view of the shuttle to load.

- **Cancel** (click on it or ENTER)
It allows to take one element out of the shuttle if you are out of the decision monitor. By clicking on the chosen object, the cursor will turn into an icon and the monitor will appear with the description of the object. «Cancel» allows you to take it out of the shuttle. The arrows allow you to choose an other object in the load.

- **Exit** (click or ENTER)
It allows to quit the decision monitor. For some load categories,these keys may not work. They are not of any use in that case.

- **Shuttle** : (shuttle icon) :
This monitor concerns the two types of fuel and «life-support». Clicking on + and - allows to add or deduct some. The consumption of «life support» amounts to 2 kg a day by person. The consumption of orbital energy amounts to 200 g by metre of altitude.

- **Experiments** («pipette» icon)
This monitor offers a choice of six scientists to land on the space station. They are meant to made experiments in weightlessness. Each successful transport increases your capital by the amount showing on the screen for the experiments you have chosen. There can be three types of experiments : biochemical, astrophysical or military. It's up to you to decide on the right time to load them, depending on your financial needs and the building stage on the station . You will notice that a passenger will appear next to the pilot when you select one of the experiments. The I.S.C. shuttle is equipped so that it can take two passengers at the most.

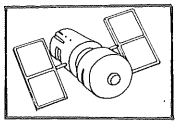
- **Repair** (tool icon) :
This monitor gives access to three mission specialists (see above) equipped with scientific gear able to sort out any breakdown which could happen on a satellite in orbit which you are in charge of.
Depending on the type of breakdown, you have to take the right specialist. You won't be able to land them if you already have two passengers.

- **Station** (station icon) :
this monitor allows you to select the modular elements of the orbital station which you must help building. Check which elements have been planned for the station on the «station» screen (see further) accessible from the control room.

- **Satellites** (satellite icon) :
This monitor shows you the satellites ready to be put into orbit within the next four months after the present date. The time limit for the indicated launching is imperative. Over that limit, the satellite will be given to a competitor (business is business !)

- **Exit** (clicking or ENTER)
on this spot allows you to go back to the base.

A 2 - SATELLITES



ORBITS: This knob offers a stylized view of the stock of orbits you have been allocated around the Earth. A presentation of this screen, called «orbital view», as well as an explanation of the command board is given further. You have six spots reserved on each of the four available orbits. They are located at a distance of 210 to 250 km from the terrestrial surface. They are numbered from 1 to 4 when going away from the Earth. The dotted low orbit is the waiting orbit where your shuttle will be launched immediately after taking off. On orbit 4, you can see the orbital station which first module is already placed at the beginning of the game.
When the game starts, it's the only object in orbit, but as soon as you have taken satellites there, you will be able to see them on this screen. When on Earth, you will be in charge of looking after their condition.

- **FEES** : Indeed, you will get monthly fees for each satellite in orbit. But if ever a breakdown (even a slight one) should affect the satellite, you will no longer get the fees. Besides, if the breakdown should get worse, you could no longer repair it on the spot with the help of a mission specialist. You'd have to get it back and take it back to the station to have it repaired, then replace it in orbit before getting the fees again. Furthermore, as long as the breakdown lasts, you will pay a monthly fine equal to the fees you got previously.

Finally, if it became impossible to repair the satellite, you would have to destroy it in order to leave the position on the orbit free.

- **CONDITION OF SATELLITES** : Information about the condition of satellites is given to you by pressing the INF key. But on a colour monitor, you can see it at once : when in good condition, a satellite is green, it goes orange in case of a slight breakdown, red in case of a serious breakdown and white if it is totally out of order.

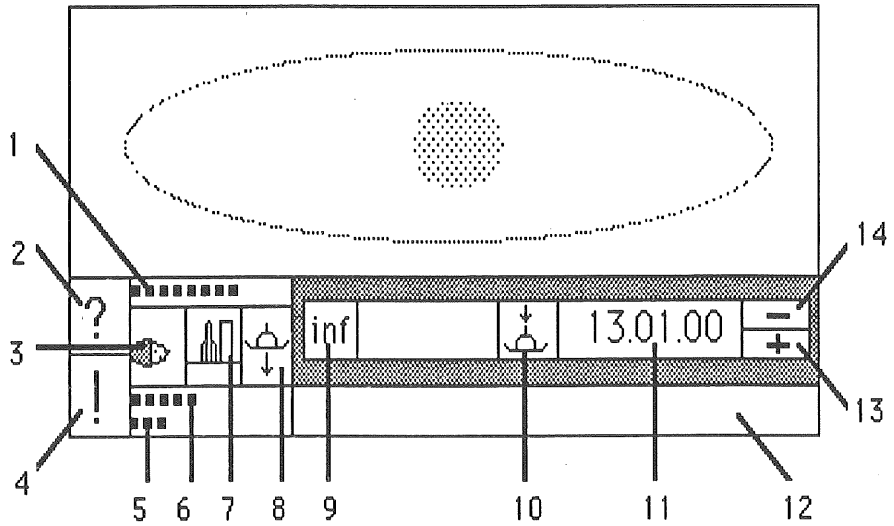
- INF : By clicking on the spot marked INF on the dashboard, you can get any useful information about your stock of orbits. If you first click on an object moving in space and then on the INF key, you will get information about that object (station, satellite, or free spot).

- **CLOCK :** The clock shows the time that passes in the orbit ; it is useful particularly after taking off. When you come into the screen, the time indicated is much faster than real time. You can either slow it down or make it faster by clicking on - or + . You can then see the effect obtained on the orbital speed of satellites. In real time, it takes a satellite placed in these orbits 1 to 1 h 20 to revolve round the Earth. It can be useful to slow down the time speed in order to click on a satellite. Especially if you use the cursor with the arrows.

To cling the cursor onto an object in orbit, click on it (or ENTER) and use the CONTROL key at the same time.

- **BASE :** The icon representing the space base allows you to go back to the base.

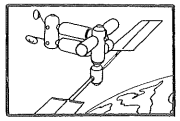
ORBITAL VIEW



1 - «orbit energy» meter
2 - energy spending estimate
3 - not used
4 - command for changing orbits
5 - thrust done
6 - thrust requested
7 - back to the base
8 - landing
9 - information
10 - going into piloting mode
11 - clock
12 - communication window
13 - acceleration of time
14 - slowing down of time

Some of these commands are only accessible from the ground, others only in flight

A 3 - STATION



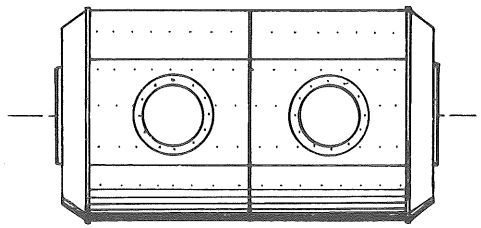
This screen concerns the orbital station. that you'll have to build during the game.

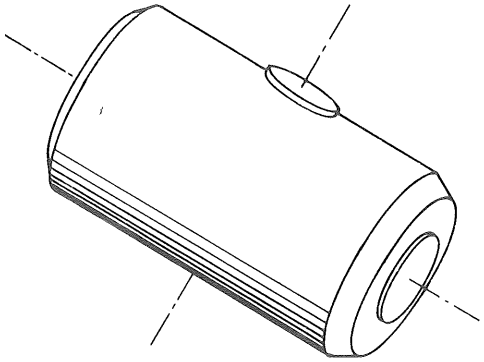
- **Modules** : On the left-hand side of the screen, you'll see a description of the five different modules which have to be put together in orbit. The «HOME» modules are to welcome the station crew. The «STORE» modules are used for storing equipment.
The airlocks (A21 , B56 , and X23) are junction modules which allow you to go from one part of the station to another.

- **Plan :** On the right hand side of the screen, you will see a plan used for the assembly of the several modules of the station. This plan will become a realistic drawing of the modules as the building of the station progresses. You can see the first module which has already been put in orbit. Your mission is to place the rest of the station planned round the modules in orbit.

- **Mooring :** You can choose the right time to load one or several elements of the station and unload them in the right place. You will just have to moor to the module already in orbit in order to convey the modules. Once delivered, those modules will be fixed according to the plan by the engineers who live in the station on a permanent basis. You will then have a certain storing volume at your disposal, to leave part of the load you do not wish to take back on to Earth in the station.

HOME





STORE

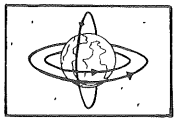
- **Congestion :** Yet, you have to know that there is only limited room in the station. Five sites are open to you in the first module already in orbit. An extra site will be cleared for each «Home» or «store» module placed. So you'd better build this station as quickly as possible in order to store the satellites which have broken down (they will be repaired there), the repair staff (they will be available to act more quickly in case of a satellite breakdown) or the experiments which must be done there.

PLEASE NOTE ! Military experiments are classified top secret ! So, if you want to land them in the orbital station, you must imperatively take out the experiments which might take place there as well as the repair mission specialists beforehand.

- **Stock :** By clicking (or ENTER) on this site, you can put information about the present content of the orbital station.

- **Exit :**Clicking (or ENTER) on this site allows you to go back to the base.

A 4 - GAME



On the base, you can interrupt a game and safeguard it, or start again a previous game or even start a new game thanks to this Game Key. In order to do so, click with the mouse on the proper keys : New Game, load or save.

- **New Game :** You are starting a new game. Put your name in the box at the bottom, then click «New Game» and enter the level of difficulty of the game (1 to 6).
On levels 1 and 2, the time between two takeoffs is 3 months long, and 1 month long on levels 5 and 6. Then press the ENTER key, and the new game will start.

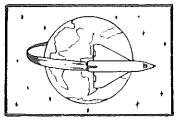
- **Load :** To load a previously safeguarded game, click on «load», put the name under which it was safeguarded (or place yourself on it with cursor) and then press «ENTER».

- **Save :**To safeguard the present game, click on «save», put the name under which you wish to safeguard it (or keep the same name), then press the ENTER key.

- **Quit :**Clicking on «Quit» allows you to quit the game. The game in progress is then lost if you have not safeguarded it before.

- **Cancel :**Allows you to go back immediately to the game in progress.

A 5 - TAKEOFF



You have completed the total loading of your shuttle and decided on your mission in detail : sending satellites, building the station, choosing mission specialists (repair) or payload (experiments). You have filled up the tanks of the shuttle and loaded enough «life support» for the crew... You only have to take off by pressing that button. The takeoff phase is not interactive. The technicians on the base are to control it. But don't worry ! Accidents are extremely rare in the year 2010 and you will undoubtedly reach your waiting orbit.

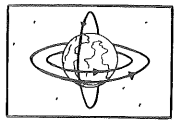
The only case in which you may be in danger would result from a mistake when applying for protection

in the launching of the software. IF there is any doubt, safeguard the game thanks to th «Game» key. At the very worst, you may start the game again by giving the right answer this time...

As soon as you have ordered takeoff, a countdown starts on the main screen of the I.S.C. base. After ten seconds, the rocket takes off and propels your shuttle into space. You can get straight to the orbital phase by keeping the space key pressed while you press the takeoff key. Release the ENTER Key or the mouse's ear before releasing the space key.

B - FLIGHT IN SPACE

B 1 - ORBIT



As soon as the shuttle has left the Earth it gets onto a waiting orbit. You can find it on a screen similar to the one which allowed to keep an eye on the satellite stock from the ground (refer to «orbital view» screen). This screen will be used to visualize all the changes of orbits. In reality, changing orbits is a complex operation which requires a lot of calculation done by big computers, and ordered from the ground.

- **Course of orbit changing :** Any change of orbit requires two successive thrusts from the boosters burning energy called «orbital».

The first thrust helps leaving the present orbit in order to place the shuttle into a new orbit, an ellipsoidal one, which trajectory intersects at some point the orbit you wish to reach.

The second thrust takes place at the very moment when the transfer orbit intersects the destination orbit. A more or less powerful thrust will allow to join the latter. Depending on its power, the shuttle will progress on its new orbit to reach the precise position wanted.

In the game as well as in reality, the greatest part of these data will be controlled by the computer programme. But you are the one who is going to determine the power of the thrusts when the computer makes an announcement. To change orbits, you will use two icons which represent a question mark and an exclamation mark,left of the dash-board.

[?] When you click on this icon, after you have made your arrival point flash (empty position or object in orbit), it will show you the total spending of orbital fuel necessary to change orbits, on the energy counter next to it. If you have a choice, you'd better ask the computer about all the empty positions of the orbit wanted, in order to do the one which will require the minimum spending.

[!] Once you have clicked on your destination, clicking on this icon will allow you to launch the orbit changing process. A window will open, representing your shuttle ready to thrust. On the lower left-hand corner of the dash-board, a first dotted line will appear, showing you the best intensity for the first thrust. By pressing the left ear of the mouse (or the ENTER key), you will put a second line below the first one which will show the real thrust done. As soon as you release your pressure, the engines will be stopped and the thrust interrupted.

If the length of your thrust is rigourously copied on the thrust planned, no problem ! The computer will show you the second thrust. If you have released your thrust either too early or too late, the computer will do an automatic correction to rectify your error. Consequently, there will be an extra spending which can amount to the equivalent of the first thrust.

Ready for the second thrust ? Do the operation again, but this time the computer will not correct any possible mistake. You will find the orbit screen. If you have thrusted too much or too little, your shuttle will be on the right orbit, but more or less far from its objective. It is up to you to decide on starting the operation again, or reaching your objective in command of the shuttle, spending all your approach energy.

INF : By clicking on the INF sign on the dash-board, you can get any useful information about your orbital stock, the same way as from the ground. If you first click on an object moving in space and then on the INF Key, you will get information about that object (station, satellite, or free site). You can also click on the shuttle first, in order to get a reminder of the load you are taking. Particularly to remember the orbits allocated to the satellites that you will put in orbit.

- **Clock :**The clock shows the time that passes in the orbit. You can either slow it down or make it faster by clicking on - or +. You can then see the effect obtained on the orbital speed of satellites. In real time, it takes a satellite placed in these orbits 1 hour to 1 hour 20 to revolve round the Earth. It can be useful to slow down the time speed in order to click on a satellite. Especially if you use the cursor with the arrows.

To cling the cursor onto an object in orbit, click on it (or ENTER) and use the CONTROL Key at the same time. The clock integrates the time spent during the changing of orbits.

- **Shuttle piloting :**This icon allows to quit the orbital screen and reach the shuttle commands. It is in the shuttle itself that you will do the aproach manoeuvres, and that you will be able to reach a certain position so that you can unload a satellite or moor to the station.

- **Back on Earth :** This icon starts up the landing phase. You can decide to land in automatic piloting, that is to skip the gliding descent and the landing which is always tricky, on the giant aircraft-carrier chartered by the Space Corps. You will just have to press the space key while you are clicking on the «return» icon. Do not release the space key until you have released the mouse. This will make you avoid any crash risk... Yet, you will not get the 10 000-unit bonus for any successful landing.

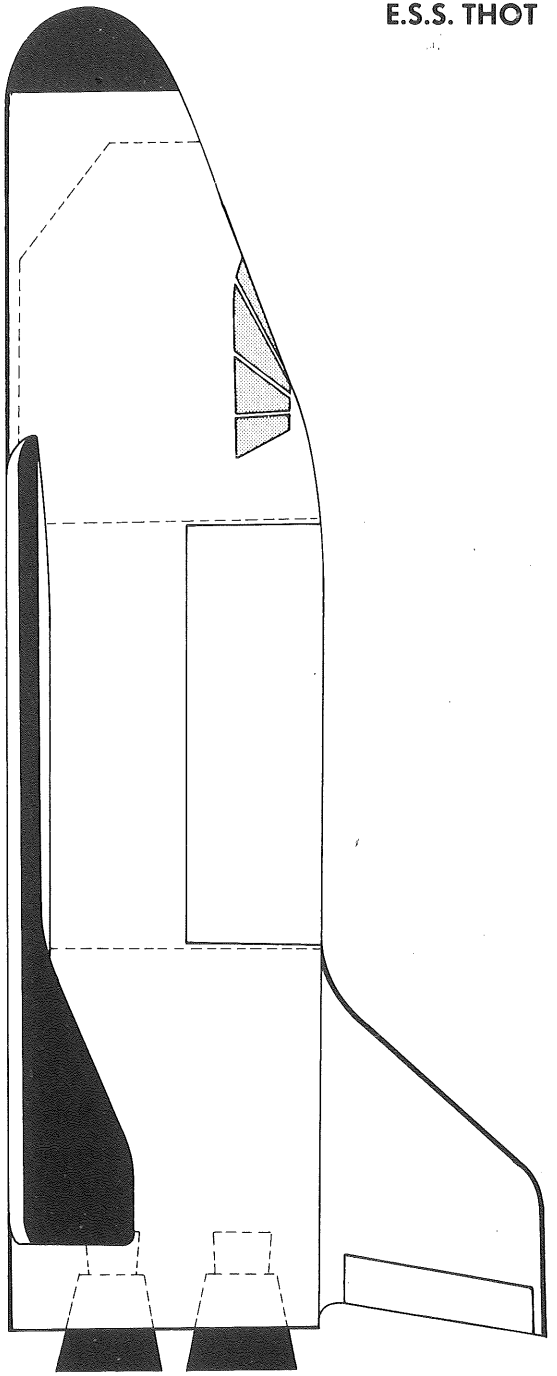
B 2 - APPROACH PHASE

The approach phase is the proper piloting itself of the space shuttle. In real time, you have to get close to the satellites and the orbital station and work around them.

The shuttle has six different translation modes (moving in one direction) whereas a plane in gravity only has one : six rotation modes are added (variation of an angle from a fixed point).
These different thrusts can be obtained thanks to 24 nozzles shared out around the shuttle. Besides, the shuttle moves in a vacuum, where there is a religious silence except short periods when the nozzles start.

The absence of gravity provokes a phenomenon which has to be well mastered in order to pilot the shuttle. When a movement is launched, it is accelerated as long as the thrust is done, but as soon as it stops, it doesn't slow down.

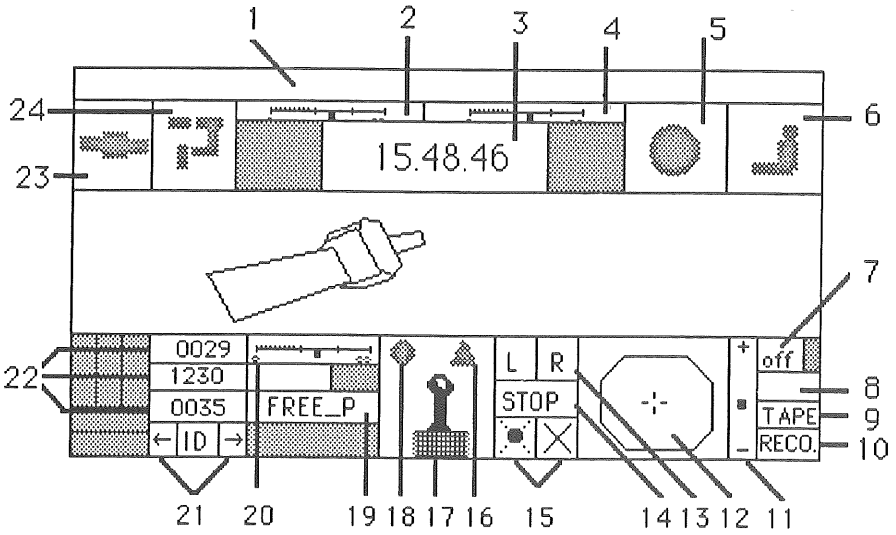
If nothing slows down its progression, any movement carries on. To cancel it, there are two solutions:



- the first and easiest one is to press the STOP Knob. But this will consume a lot of fuel ;

- the second solution is to do a counter-thrust (counter-translation or counter-rotation). Exactly opposite to the previous movement. Quite easy, in the case of an only thrust, the game gets more complicated if you combine different movement modes.

SHUTTLE'S SCREEN



1 - communication window
2 - «approach energy» counter
3 - clock
4 - «life support» counter
5 - return to orbital view
6 - going out in a space-suit
7 - fire/load
8 - laser off/on
9 - tape
10 - record
11 - setting of radar field + or -
12 - radar
13 - longitudinal rotation left (L) or right (R)
14 - stop
15 - forward-backward translation
16 - translation
17 - direction handle
18 - rotation
19 - object spotting
20 - distance between shuttle and object
21 - changing objects
22 - coordinates x,y,z, or position angles of the shuttle
23 - unloading of satellite
24 - mooring to the station

Lateral rotations : Rotations oriented downward, upward, to the right or to the left can be obtained by placing the cursor on the handle in the middle of the screen.
By clicking to the left, the cursor disappears and you control the handle as long as you keep the left ear of the mouse downwards. You can also get the same rotations by pressing the corresponding arrow. For all rotations, the round knob lights up.
- To raise the nose to the top, pull the handle towards yourself like in a plane.
- To nosedive, push the handle forward.
- For right/left turnings, place the handle in the position wanted .

Lateral translations : Translations oriented downwards, upwards, to the left or to the right can also be obtained by placing the cursor on the handle in the middle of the screen.
By clicking to the right, the cursor disappears and you control the handle as long as you keep the right ear of the mouse downwards. You can also get them by pressing the CONTROL key and the corresponding arrow. For all translations, the triangular knob lights up. It is interesting to note that you can combine translations and rotations by using the arrows on the keyboard and the mouse.

Forward/backward translations : They can be obtained by clicking on AV and AR knobs (see screen) with the cursor.

Longitudinal rotations right/left : These rotations are essentially used to replace the triangle pointed upwards to moor to the station. It is better to launch them separately from any other movement. They can be obtained by clicking on the RD and RG knobs (see screen) with the cursor.

Stop : If you use this knob with the cursor, it will cancel (by a series of counter-thrusts) all the movements done previously. It will provoke a complete stop of the shuttle in the position it has. You can also get the stop by pressing the space key.

Radar : The radar allows you to spot any object (satellite, station, debris,...) which is near the shuttle. You can adjust the range of this radar by placing the cursor on the marker which is left of the radar and can move between + and -. The shuttle is supposed to be in the middle of the radar picture. Objects are placed normally around the shuttle : top, bottom, right, left. If an object is in front of the shuttle, it will appear in the shape of a triangle. If it is behind the shuttle, it has the shape of a square.

ID (identification) : The coordinates of the Thot shuttle are always on 0.0.0. By clicking on the arrows with the cursor, you will choose among several objects the one which coordinates you want to know (x,y,z). The name of the object will appear in the small box next to the coordinates.

The object starts flashing on the radar. Over 6000 metres, the object is considered to be «LOST». To get closer to an object, you have to go towards it in order to bring its coordinates as close as possible to 0.0.0. Mooring to a station or a satellite can only be done on some very precise coordinates.

Tab : By pressing the tabulator on the keyboard (TAB KEY), the display of coordinates is replaced by the display of orientation angles (on 360°). The 0.0.0. angles correspond to the terrestrial surface plan, perfectly oriented in the rotation axis. When the shuttle gets to a new orbit, when you take command for the approach phase, it is always placed on the 0.0.0 angle. Objects put into orbit are also oriented on that angle.

Distance : On this counter, the relative distance betwen the shuttle and the object selected with I.D.

will appear. It can be useful to choose the closest among several debris.

Record : The shuttle is equipped with a mechanism which allows to record part of the flight. It will record picture by picture all the movements done as from the time when the «Record» mode is started. It can then reproduce them, varying the shot angle.

Tape : When one or several images have been recorded by «Record», you can view them again by pressing «Tape». To put the camera closer, you have to press the 9 key and to put it farther, press the 7 key.

You can move the camera with the arrows on the keyboard. If the movement makes the shuttle go out of the field of vision, it will automatically place itself back after a few seconds.

The «video-recorder» keys which appear beneath the coordinates allow you to rewind, to freeze frame, to start recording or wind.

Laser : To destroy a satellite which is out of order or a debris which is in the way, start the laser by clicking on the «off» knob with the cursor. A sight will appear in the middle of the screen and the knob will pass on «ON». Now you have to place the object to be destroyed in the middle of the sight, and then press the «Fire»knob. An ultra-powerful laser will then raise the object to such a high temperature than it will come out of shape. A few laser rays will sometimes be necesssary to turn it into gas, for all its particles have been raised to a temperature called «sublimation». The laser may need recharging. The «Fire» knob then changes into «Load» for a few seconds. Be careful ! you must switch off the laser (back to «off») before going back to the orbit screen or before you let a man go out in a space-suit.

Satellites : To unload a satellite you have loaded, you will have to find an empty site on the adequate orbit for this satellite. If there are any debris or a satellite out of order on this orbit, the computer will refuse to unload the satellite until these objects have been destroyed.

When the site is empty, you will have to find with I.D. the site of the precise position planned for this satellite.

You must unload the satellite within a distance of 100 m from the «Free Position». To reach that position easily, it can be useful to replace the orientation angles of the shuttle on 0.0.0. with the TAB key (see above).

To choose which satellite you should unload (if there are several in the store room), you can always change the page suggested by the monitor, thanks to the forward/backward arrows. When you get close to a satellite which has to be repaired, you must stay within a distance of 50 m until you come out in a space-suit. It is the safety distance to avoid a collision with the space-suit when coming out into space.

Station : To load or unload equipement in the station, you must moor the shuttle to it. Moving is always done on the first module of the station, the one which is already in orbit when the game starts. You have to get close to the black side which has a blue triangle. The coordinates must be on the -25.0.0 positions. You then click with the cursor on the «Station» knob . Then ,you'll get to a screen representing the shuttle on the left and the station on the right. The flashing spots in the station can each receive an object. To transfer the objects from the shuttle to the station (or vice-versa),first click on the logo that represents the object to be moved. Then click on «Select» with the cursor. The object will automatically place itself in the station.The «Cancel» and

«Exit» keys are used to cancel transfer. The «Forward / Backward» arrows are used to change objects.

To get the shuttle's commands back, click on «Exit».

»Approach Energy» Counter : This counter shows your stock of fuel which you need for approach manoeuvres. When it gets close to zero, you will get a message asking you to go back on the Earth .You will then get back to the orbit phase, and you'll be able to start the landing manoeuvre.

Life Support : This counter indicates your available water, oxygen, ...etc stock. If it is close to zero, a message will ask you to go back on the Earth as soon as possible. You must absolutely obey as quickly as possible. If your «Life Support» stock came down to zero, the game would be over.

Clock : The clock works in real time.

Orbit : This knob will allow you to go back to the «Orbit» screen so as to change orbits. You must go back to this screen in order to visit another orbit or to go back on the Earth.

Caution ! a slight manoeuvre is automatically started to place the shuttle perfectly on the orbit's plan. If you go and return, even quickly, from the «Orbit» screen to the «Shuttle» screen, you will notice that the shuttle has changed positions.

This knob cannot work if the laser or the camera are on.

Space-Suit : This knob allows you to go out in space if there is a mission specialist in the crew. You can choose which specialist you will send outside by clicking on «Select» on the monitor that will appear. Be careful ! before going out, make sure the shuttle is not too close to any other object! The specialist may hit it when coming out.

Collision : When the shuttle gets too close to an object in space, you will get some messages:

-»Go slowly»: you are in the sphere of influence of the object, slow down !

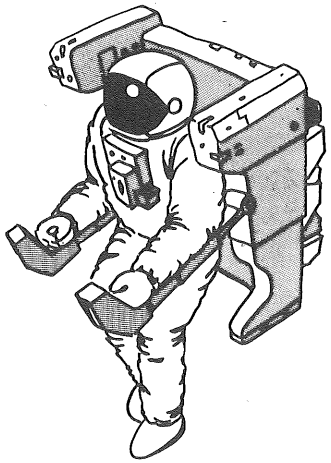
-»Warning ! Collision !» you are going to hit the object !

If the collision does happen, the computer will take command and start a thrust opposite to the one which made you hit the object.

But you might have damaged one of the nozzles in the accident.

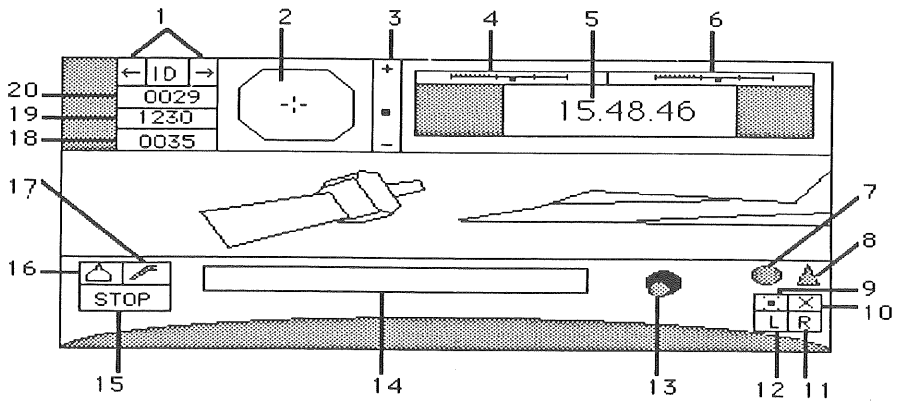
Give Up : If you have completely lost control of your shuttle or if, for any reason you wish to interrupt your mission at once, there is a key to give up: F1.

B3 - MANOEUVRES IN SPACE



When the mission implies some work to be done on a satellite -repair, recuperation, etc... - and if there is at least one mission specialist in your crew, the latter can go out of the shuttle in an autonomous space-suit. The shuttle should be at a proper distance from the satellite to avoid any risk of collision.
The»Space-Scooter» allows to move in all directions. Its driving is absolutely similar to driving the shuttle: 24 nozzles give 12 possibilities of thrusts : 6 translations and 6 rotations.

SPACE SUIT SCREEN



1-changing objects
2-Radar
3-setting of radar field + or -
4-»approach energy» counter
5-clock
6-»life support»counter
7-rotation mode
8-translation mode
9- forward translation
10-backward translation
11/12-longitudinal rotation left (2) and right (R)
13-piloting handle
14-communication box
15-stop
16-return to shuttle
17-repair
18/19/20- x, y, z coordinates

Lateral Rotations : The rotations oriented downwards, upwards, right or left can be obtained by placing the cursor on the handle right of the screen.

By clicking to the left, the cursor will disappear and you will control the handle as long as you keep the left ear of the mouse downward. You can also obtain them by pressing the corresponding arrow.

For all rotations, the round knob wil light up.
-To raise the nose (to the top, pull the handle forwards upwards) forwards you like in a plane.
-To nose-dive, push it forward.
-For right/left turnings, place the handle in the position wanted.

Lateral Translations : Translations oriented downwards, upwards, to the right or to the left can also be obtained by placing the cursor on the handle in the middle of the screen.

By clicking to the right, the cursor will disappear and you will control the handle as long as you keep the right ear of the mouse downward. You can also obtain them by pressing the CONTROL key and the corresponding arrow.
For all translations, the triangular knob will light up. It can be interesting to notice that you can combine translations and rotations using at the same time both arrows on the keyboard and the mouse.

Forward / Backward Translations : They can be obtained by clicking on the 9 and 10 knobs with the cursor (see screen).

Longitudinal Rotations Right / Left :
These rotations are essentially used to reproduce the rotation of the space-suit on the pattern of the rotation of a satellite, to stop any apparent movement and synchronize your approach. It is better to start them separate from any other movement. They can be obtained by clicking on the 11 and12 knobs with the cursor (see screen).

Stop : If you use this knob with the cursor, it will cancel (by a series of counter-thrusts) all the movements done previously. It will provoke a complete stop of the space-suit in the position it has.

Repair (tool icon) : This knob allows you to repair the satellite.You have to press it when you are at the right distance from the satellite, facing the cross. The satellite, must then be on the 15.0.0 coordinates. It is important, in the case of a gyrostabilized satellite, that is to say one that revolves on itself, to synchronize your rotation on its so that the apparent movement should stop.
If the misson specialist who is trying to repair the satellite does not have the qualifications required, a message will tell you what kind of breakdown it is.

Return to the Shuttle (shuttle icon) : To go back to the shuttle, you have to get close to it at a distance of about 20m . You can then press the knob which will automatically make you enter the shuttle.

Radar : The radar allows you to spot any object (satellite station, debris etc...) which is near the space-suit. You can adjust the range of this radar by placing the cursor on the marker which is right of the radar and can move between + and - .
The space-suit is supposed to be in the middle of the radar picture. Objects are placed normally around the shuttle : top, bottom, right, left.
If an object is in front of the shuttle, it will appear in the shape of a triangle. If it is behind the shuttle, it has the shape of a square.

ID (identification) : Among several objects the one which coordinates you want to know (x,y,z). The name of the object will appear in the small box next

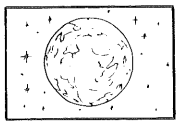
to the coordinates. The object starts flashing on the radar. Over 6000 metres, the object is considered to be «Lost». To get closer to an object, you have to go towards it in order to bring its cooordinates as close as possible to 0.0.0.

»Approach Energy» Counter : This counter indicates the stock of fuel which is necessary for manoeuvres. When it gets close to zero, you will get a message asking you to go back to the shuttle.

Life Support : This counter shows your available stock of oxygen. If it gets close to zero, a message will ask you to go back to the shuttle as soon as possible. If your life support stock came down to zero, the game would be over .

Clock : The clock shows the real time spent.

B4 - LANDING



The starting of the retro-rockets which allow to leave the orbit and go back on the Earth is controlled from the ground. You will find yourself directly in the gliding phase. The landing screen will appear.

The purpose of this phase is to get close to the shuttle-carrier and succeed in the landing. If you reach your goal, you will get an Exceptional bonus of 10.000 kilo-crowns. In the opposite case, a penalty of the same amount will be taken out of your capital. Remember it is possible to choose automatic landing : by clicking on the Return to Earth icon, you have to press the space key at the same time. Do not release the space key until you have released the icon. Which, practically speaking, allows you to skip this phase and avoid the risks it implies.

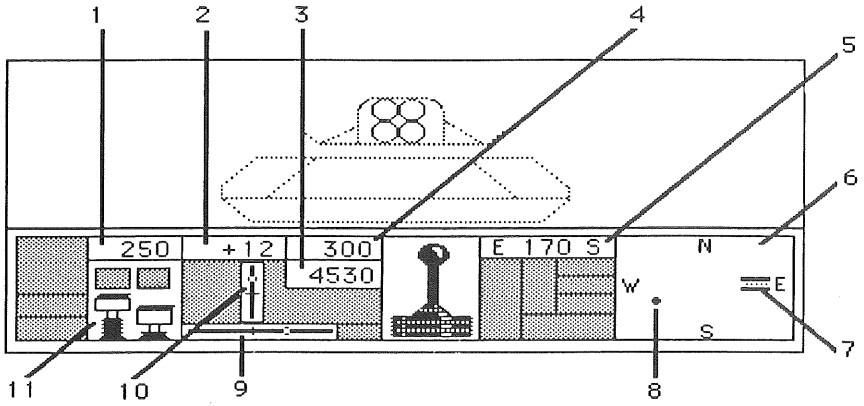
The radar, right of the dash-board, shows where the shuttle-carrier is (the rectangle right of the radar-screen) as well as the position of the shuttle (the black point moving slowly). It is important to make a good approach in order to face the landing track, to land smoothly, in a nose-up position.

The principle of gliding (without engine) makes it necessary for you to control your pitch angle perfectly in order to remain at the right altitude. Indeed, the bigger the incidence angle is, the slower the shuttle will tend to go down.

The following graphs will show you the vertical speed of the shuttle (positive downwards) depending on its horizontal speed. These figures are given for different pitch angles.

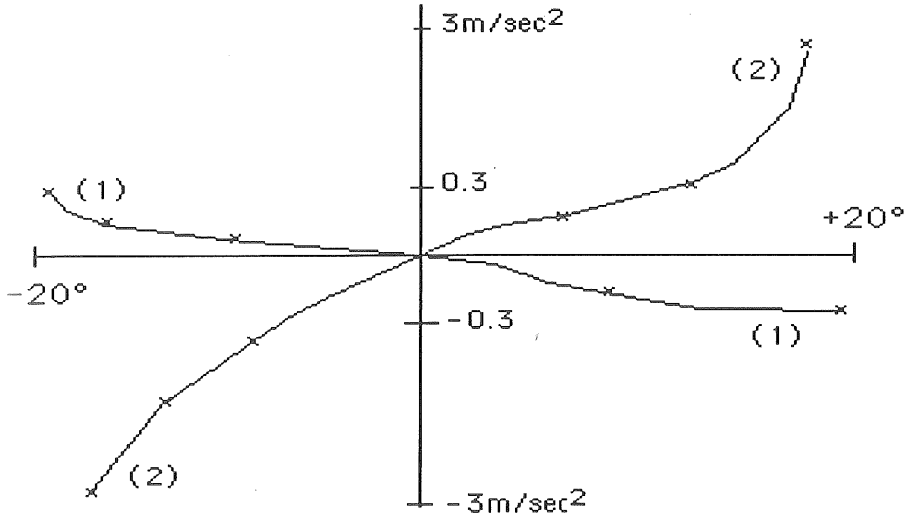
The pitch angle is limited from + or - 20°. You will notice that for a great horizontal speed and nose-up position (large pitch angle), the shuttle will be able to gain altitude. Indeed, the lift which is the aerodynamic force which is contrary to gravity is greater than the weight of the shuttle.

LANDING SCREEN



1-altitude (in metres)
2-vertical speed (m/sec)
3-distance to shuttle-carrier
4-horizontal speed
5-compass
6-radar
7-shuttle-carrier
8-shuttle
9-pitch (-20° to +20°)
10-rotation angle (-45° to +45°)

ACCELERATIONS DEPENDING ON THE PITCH ANGLE



1-vertical acceleration

2-horizontal acceleration

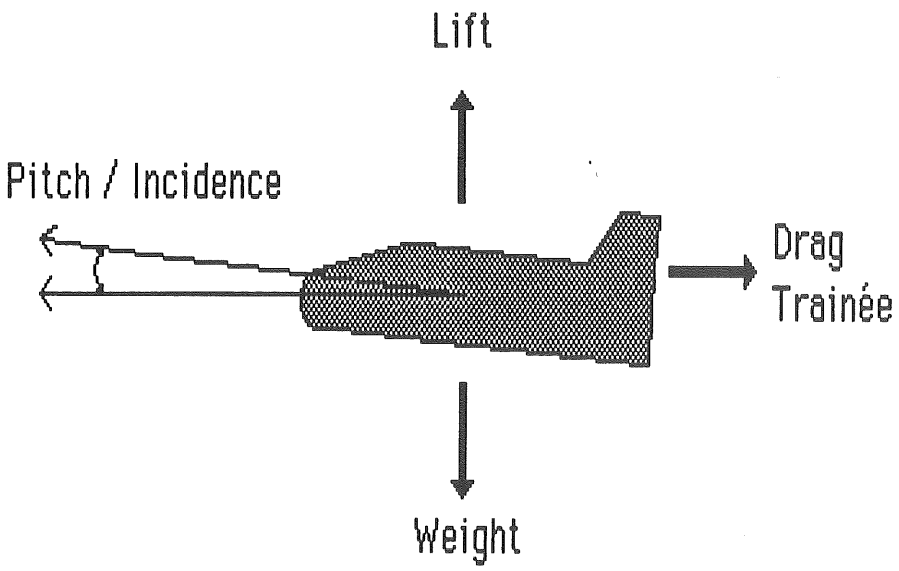
Here, acceleration is the variation of speed in one second.

The vertical speed is positively oriented downwards.

Commands:
- to increase the pitch : key arrow upwards.
- to reduce the pitch : key arrow downwards.
- right turning : key arrow right.
- left turning : key arrow left.

-to get the landing gear out : place yourself horizontally (no pitch), then press the ENTER Key.

-to slow down at the end of the landing : SPACE Key



KEYBOARD COMMANDS

BASE AND ORBIT

The arrow on the keyboard allow you to move the cursor when there is no mouse.

Left Shift : accelerates the movement of the cursor
Right Shift : slows down the movement of the cursor

ENTER : click on mouse
CONTROL : allows to cling to an object in orbit

LANDING

Increase pitch : arrow upward

Reduce pitch : arrow downward

Left/right turnings : left/right arrows

Wheels out : ENTER (only in horizontal position)

Brakes : space key

SHUTTLE AND DIVING- SUIT

You can commutate the use of the arrows on the keyboard, either to move the cursor(F10 key), or to move the handle (F9 key)

Lateral rotations :

up : arrow downward

down : arrow upward

right/left : right/left arrows

Lateral translations :

up : arrow downward + CONTROL key

down : arrow upward + CONTROL Key

right-left : right/left arrows + CONTROL Key

Forward/backward translations :
+ and - knobs

Longitudinal rotations light/left :
stop other movements, commutate with F 10, then move the cursor with the arrows and click on the dash board

Stop : space key

ESC : freeze frame

F1 : give up

F5 : increases focus

F6 : reduces focus

F10 : cursor

TABLE OF CONTENTS

EUROPEAN SPACE SIMULATOR

ESS THE GAME

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B 4 - LANDING

TO START THE PROGRAMME

- **ATARI ST and AMIGA** : insert the disc (if the programme includes several discs, insert disc 1 or the **LOADER** disc) and switch on the computer. The programme will load automatically.

- **COMPATIBLE PC** : switch on the computer, insert your disc (if the programme includes several discs, insert disc 1 or the **LOADER** disc) type LOADER then validate by pressing ENTER or RETURN key.
A menu showing different graphic cards will appear. Make your choice...
Then depending on which programme you have, you are given a choice of two menus
- one concerning the type of mouse
- the other concerning the sound : be careful, the choice «sound with MDO Intersound» is only possible is you have this interface

REMARK : for those who use MDO Intersound with VGA graphic card, you must have an AT extended memory. In case of a problem, contact our After Sales service.

TO SERVE YOU BETTER

We have taken the greatest care in the production of this programme.

If howerer, an error has crept in despite our various control tests, or if you have any comment which would enable us to improve this programm, please don't hesitate to contact us, so that changes can be made in a future issue.

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